Title: Synthesis, Antimicrobial and Antiproliferative Activity of Novel Silver(I) Tris(pyrazolyl)methanesulfonateand 1,3,5-Triaza-7-phosphadamantane Complexes

Author(s): Pettinari, Claudio[1]; Marchetti, Fabio[2]; Lupidi, Giulio[1]; Quassinti, Luana[1]; Bramucci, Massimo[1]; Petrelli, Dezemona[1]; Vitali, Luca A.[1]; Guedes da Silva, M. Fátima C.[3,4]; **Martins, Luísa M. D. R. S.**[3,5]; Smolenski, Piotr[6]; Pombeiro, Armando J. L.[3]

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Abstract: Five new silver(I) complexes of formulas [Ag(Tpms)] (1), [Ag(Tpms)-(PPh3)] (2), [Ag(Tpms)(PCy3)] (3), [Ag(PTA)][BF4] (4), and [Ag(Tpms)(PTA)] (5) {Tpms = tris(pyrazol-1-yl)methanesulfonate, PPh3 = triphenylphosphane, PCy3 = tricyclohexylphosphane, PTA = 1,3,5-triaza-7-phosphaadamantane) have been synthesized and fully characterized by elemental analyses, H-1, C-13, and P-31 NMR, electrospray ionization mass spectrometry (ESI-MS), and IR spectroscopic techniques. The single crystal X-ray diffraction study of 3 shows the Tpms ligand acting in the N-3-facially coordinating mode, while in 2 and 5 a N2O-coordination is found, with the SO3 group bonded to silver and a pendant free pyrazolyl ring. Features of the tilting in the coordinated pyrazolyl rings in these cases suggest that this inequivalence is related with the cone angles of the phosphanes. A detailed study of antimycobacterial and antiproliferative properties of all compounds has been carried out. They were screened for their in vitro antimicrobial activities against the standard strains Enterococcus faecalis (ATCC 29922), Staphylococcus aureus (ATCC 25923), Streptococcus pneumoniae (ATCC 49619), Streptococcus pyogenes (SF37), Streptococcus sanguinis (SK36), Streptococcus mutans (UA1S9), Escherichia coli (ATCC 25922), and the fungus Candida albicans (ATCC 24443). Complexes 1-5 have been found to display effective antimicrobial activity against the series of bacteria and fungi, and some of them are potential candidates for antiseptic or disinfectant drugs. Interaction of Ag complexes with deoxyribonucleic acid (DNA) has been studied by fluorescence spectroscopic techniques, using ethidium bromide (EB) as a fluorescence probe of DNA. The decrease in the fluorescence of DNA EB system on addition of Ag complexes shows that the fluorescence quenching of DNA EB complex occurs and compound 3 is particularly active. Complexes 1-5 exhibit pronounced antiproliferative activity against human malignant melanoma (A375) with an activity often higher than that of AgNO3, which has been used as a control, following the same order of activity inhibition on DNA, i.e., 3 > 2 > 1 > 5 > AgNO3 >> 4.

KeyWords Plus: Crystal-Structure, Escherichia-Coli, Oxyanion Salts, Solid-State, Vibrational Spectroscopy, Coordination Chemistry, Phosphine Complexes, Colorimetric Assay, Infrared Spectra, Halide-Complexes

Reprint Address: Pettinari, C (reprint author), Univ Camerino, Sch Pharm, Via S Agostino 1, I-62032 Camerino, MC, Italy.

Addresses:

1. Univ Camerino, Sch Pharm, I-62032 Camerino, MC, Italy
2. Univ Camerino, Sch Sci & Technol, I-62032 Camerino, MC, Italy
3. Univ Tecn Lisboa, Inst Super Tecn, Ctr Quim Estrutural, P-1049001 Lisbon, Portugal
4. Univ Lusofona Humanidades & Tecnol, ULHT Lisbon, P-1749024 Lisbon, Portugal

5. Inst Super Engn Lisboa, Area Dept Engn Quim, P-1059007 Lisbon, Portugal
6. Univ Wroclaw, Fac Chem, PL-50383 Wroclaw, Poland

E-mail Address: claudio.pettinari@unicam.it; fatima.guedes@ist.utl.pt; piotr.smolenski@chem.uni.wroc.pl; pombeiro@ist.utl.pt

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